Associations between early exposure to intimate partner violence, parental depression and subsequent mental health outcomes

Nerissa S. Bauer, MD, MPH; Amy L. Gilbert, JD, MPH; Aaron E. Carroll, MD, MS; et al

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Authors:

Nerissa S. Bauer, MD, MPH

Department of General & Community Pediatrics

Department of Children's Health Services Research

Indiana University School of Medicine

Indianapolis, Indiana

Amy L. Gilbert, JD, MPH

Department of General & Community Pediatrics

Department of Children's Health Services Research

Indiana University School of Medicine

Indianapolis, Indiana

Aaron E. Carroll, MD, MS

Department of General & Community Pediatrics

Department of Children's Health Services Research

Indiana University School of Medicine

Indianapolis, Indiana

Stephen M. Downs, MD, MS

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Department of General & Community Pediatrics

Department of Children's Health Services Research

Indiana University School of Medicine

Indianapolis, Indiana

Corresponding Author:

Nerissa S. Bauer, MD, MPH

410 W. 10th Street, Suite 1000

Indianapolis, IN 46202

Email: nsbauer@iupui.edu

Office: 317-278-0552

Fax: 317-278-0456

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Nerissa S. Bauer, MD, MPH is the first author and responsible for the conception and design, analysis and interpretation of the data. Dr. Bauer drafted the article and revised it critically with the input of co-authors and other individuals who agreed to read early versions of the manuscript. Dr. Bauer gives final approval of the version of the paper as it is submitted.

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Abstract

Objective: To examine the association between parent reports of intimate partner violence (IPV) and depressive symptoms within the first 3 years of a child's life with subsequent mental health conditions and psychotropic drug treatment.

Design: Prospective cohort study linking parental IPV and depression with subsequent billing and pharmacy data.

Setting: 4 pediatric clinics between November 2004 and June 2012

Patients/Participants: 2,422 children

Main Exposure: Any report of IPV and/or parental depressive symptoms from birth to 3 years of age.

Main Outcome Measures: ICD-9 mental health diagnoses and any psychotropic drug treatment between 3 and 6 years of age.

Results: 2.4% of caregivers (n=58) reported both IPV and depressive symptoms before their children were 3 years of age, 3% (n=69) of caregivers reported IPV only, 29% (n=704) reported depressive symptoms only, and 65.7% (n=1,591) reported neither exposure. Children of parents reporting both IPV and depressive symptoms were more likely to have a diagnosis of attention-deficit hyperactivity disorder (ADHD) (AOR 4.0; 95% CI: 1.5-10.9), even after adjusting for child gender, race/ethnicity, and insurance type. Children whose parents reported depressive symptoms were more likely to have been prescribed psychotropic medication (AOR 1.9; 95% CI: 1.0-3.4).

Conclusions: Exposure to both IPV and depression before 3 years is associated with preschool-onset ADHD; and early exposure to parental depression is associated with being prescribed psychotropic medication.

Introduction

Approximately 1 in 4 women and 1 in 7 men report experiencing some form of intimate partner violence (IPV) over their lifetimes, with an estimated 1.5 million women being physically abused or raped by an intimate partner in the United States each year.[1-5] The Centers for Disease Control and Prevention defines IPV as "a pattern of coercive behaviors that may include repeated battering and injury, psychological abuse, sexual assault, progressive social isolation, deprivation and intimidation."[2] Such violence increases the likelihood of long-term physical and mental health effects for victims, including depression, post-traumatic stress and substance abuse, physical ailments such as chronic pain and headaches, and lower self-esteem.[6-9]

It has been estimated that every year at least 1.5 million children witness IPV,[2-5] which has been associated with increased risk for behavioral and mental health problems.[10-13] One explanation for this may be that mothers experience impaired functioning following episodes of violence, which then impacts childhood behavioral outcomes.[13,14] Exposure to IPV and parental depression together have also been linked to behavioral problems and poor school functioning.[15] Moreover, witnessing IPV as a child is a known risk factor for experiencing IPV and poor health in adulthood.[16] Independent of IPV-related depression, it has also been shown that exposure to any parental depression puts children at greater risk for decreased cognitive ability and increased behavioral problems.[15,17-20] These negative outcomes are true regardless of the timing of exposure to parental depression.[21-25]

These studies provide support for the idea that pediatricians should actively screen for IPV and parental depression along with other risk factors associated with poor childhood behavioral health outcomes. However, most studies examining the effects of IPV on children are drawn from high-risk samples, such as families seeking assistance from battered women shelters

or court-reported IPV.[11,26-30] Moreover, a majority of studies examining the association between IPV and childhood behavioral health outcomes have been among school-aged children.[12,15,31,32] Far less is known about this association among preschoolers.[33] This study not only adds to existing literature showing that IPV and parental depression are associated with childhood mental health, behavioral and social concerns; but also expands upon it by focusing on the manifestations of these problems in a younger and more generalizable population of preschool-aged children seen in primary care settings. This study is also distinguished by its prospective study design.

Methods

Patients and Methods

Study Design

This prospective cohort study followed children in four Indianapolis community health centers where families were routinely screened for IPV and depression during the course of routine primary care clinical encounters. Billing and pharmacy claims data were extracted from the Regenstrief Medical Record System (RMRS) and Indiana Network for Patient Care (INPC) databases. This study was approved by the Indiana University Office of Research Administration-Human Subjects.

Data Sources

The Child Health Improvement through Computer Automation (CHICA) system is a comprehensive pediatric primary care computerized clinical decision support system comprising a knowledge base of guideline rules, a repository of patient data, a tailored printing and scanning

engine, and business rules that direct the communication, printing, and scanning of patient-specific documents.[34] CHICA, currently utilized in four primary care practices, has provided real-time decision support for more than 32,000 pediatric patients since its launch in 2004.

Data for this study were captured from the pre-screener form (PSF) that parents complete in the waiting room. The functionality of CHICA has been described elsewhere,[34-37] but in brief, the PSF includes 20 health assessment questions, drawn from a roster of national guidelines for preventive and chronic care that are specifically selected for inclusion based on the child's age and history.[37] The PSF is then scanned back into the CHICA system by the nursing staff prior to the physician encounter.

Previous studies have demonstrated the feasibility of screening for IPV in pediatric settings, and universal screening in these settings has been shown to increase significantly the number of victims identified.[38,39] For these reasons, screening questions specific to IPV were added to CHICA's library of queries in 2004.

Outcome data for this study were obtained from the Regenstrief Medical Record System (RMRS). The RMRS has supported the county hospital system since the mid-1970s, and was expanded in 2004 to form the Indiana Network for Patient Care (INPC).[40] A statewide health information exchange built for the interchange of standardized and interoperable clinical data for clinical, public health, and research purposes, the INPC currently includes clinical data from 45 hospitals and the laboratories, imaging centers, pharmacies, and large-group practices tied closely to those hospital systems. The INPC also receives data from healthcare payers.

Study Population

For the purposes of this study, we focused on children receiving care at clinics served by the CHICA system from November 2004 to June 2012. In order to quantify parent reports of IPV, parental depressive symptoms and subsequent mental health diagnoses and/or psychotropic treatment, we included subjects who had at least 2 visits documented in CHICA: one visit falling between birth and 36 months (3 years) to classify exposures to IPV and parental depressive symptoms, and a second visit falling between 37 months and 72 months (6 years) to classify the outcomes of interest.

Measures

Intimate Partner Violence (IPV)

The IPV screening questions on the PSF are: (1) "Has your partner kicked, hit or slapped you?" and (2) "Do you feel safe in your home?" Both questions are asked annually for children younger than 11 years. We defined a child as having IPV exposure if there was a positive response to either question at any visit between birth and 36 months of age. If no affirmative responses were captured for any visits during this timeframe, the child was categorized as having no IPV exposure. If all visits captured in this timeframe had no data captured, we considered the data missing.

Parental Depressive Symptoms

Initially, the depression-screening items printed on the PSF were derived from the Patient Health Questionnaire-2 (PHQ-2),[41] which measures parental report of depressed mood ("Parents often get depressed. In the past month, how often have you felt down, depressed or hopeless?") and anhedonia ("In the past month, have you lost interest or pleasure in doing things?"). In

2010, these questions were replaced by adaptations of the 3 anxiety subscale items from the Edinburgh Postnatal Depression Scale (EPDS-3)[42]: "In the past 7 days, have you blamed yourself unnecessarily when things went wrong?"; "In the past 7 days, have you felt scared or panicky for not a very good reason?"; and "In the past 7 days, have you been anxious or worried for no good reason?" This screening tool has been shown to have high sensitivity (95%) and a negative predictive value (98%) for postpartum depression. CHICA prints these parental mood questions on the PSF every 90 days during the first 15 months of life. If a parent endorsed any of the surveillance items at any visit within the first 3 years of life, a child was considered to be exposed to parental depressive symptoms.

Socio-demographic Characteristics

Child gender, race/ethnicity, and insurance type were all obtained from the CHICA database. Insurance type was used as a proxy for socio-economic status.

Mental Health Conditions

We identified which children in our cohort developed mental health conditions by the following International Classification of Diseases, ninth revision (ICD-9) diagnostic codes: disruptive behavior disorder (DBD, 312.*), attention-deficit hyperactivity disorder (ADHD, 314.*), anxiety (300.*), depression (311.*), sleep disturbance (307.4), or adjustment disorder (309.*) recorded after 37 months of age.

Psychotropic Drug Treatment

We identified psychotropic drug treatment by extracting prescriptions that were dispensed at hospitals and community pharmacies participating in INPC. Psychotropic drug treatments of interest included stimulant medications, non-stimulants, alpha-2-agonists, atypical antipsychotics, sleep agents, and selective serotonin reuptake inhibitors. For a complete list, see Table 1.

Statistical Analysis

Bivariate analyses of parental report of IPV, parental depressive symptoms, and socio-demographic characteristics were performed using the chi^2 test. Since parental mood and IPV were significantly correlated ($p \leq 0.05$), we sought to determine the relative contribution of each exposure to the outcomes of interest by creating a separate "early risk factor" variable with 4 categories for (IPV only, parental depressive symptoms only, both IPV and parental depressive symptoms, and none). Logistic regression models were used to assess the association between this new variable and each mental health diagnosis, adjusting for child gender, race/ethnicity, and insurance. Additional models tested associations between the early risk factor variable and a child having been prescribed psychotropic medication. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) were calculated for each model. All analyses were performed using Stata 11 (StataCorp, College Station, TX, 2010).

Results

There were 2,422 subjects in the study cohort. See Table 1 for sample characteristics. Approximately 52% of the sample was male and a large proportion was black (40.6%) or Hispanic/Latino (45.5%). The sample was 10.5% white, and a majority had public insurance

(90%). By age 3, IPV and depressive symptoms together were reported by 2.4% (n=58) of parents, 3% (n=69) reported IPV only, 29% (n=704) reported depressive symptoms only and 65.7% (n=1,591) reported neither.

The rate of subsequent mental health disorder between age 3 to 6 varied by diagnosis: ADHD (3.3%); DBD (8.7%); anxiety (0.7%); depression (0.4%); sleep problems (0.3%) and adjustment disorder (1.7%) based on ICD-9 administrative billing data (See Table 2). Approximately 2% of children had been prescribed psychotropic medication based on pharmacy claims data.

Based on the Fisher's exact or Chi^2 test, the prevalence of ADHD after age 3 was significantly associated with parent-reported depressive symptoms (4.5% vs. 2.8%, $p \leq 0.03$). The prevalence of ADHD among children exposed to IPV in the first 3 years of life almost reached statistical significance (6.3% vs. 3.1%, $p=0.06$). Children whose parents reported depressive symptoms had a higher likelihood of receiving psychotropic medication (2.9% vs. 1.6%, $p \leq 0.03$).

Results of multivariable logistic regression revealed significant associations between the combination of parental IPV and depressive symptoms and preschool-onset ADHD (AOR 4.0; 95% CI: 1.5-10.9), after adjusting for child gender, race/ethnicity, and insurance type. Additionally, parental depressive symptoms before age 3 was associated with a child having been prescribed psychotropic medication after age 3 (AOR: 1.9; 95% CI: 1.0-3.4). Multivariable logistic regression models for other preschool mental health diagnoses were not statistically significant (See Table 3).

For the subset of children exposed to parental depression and prescribed a psychotropic medication (n=20), 75% of medications were for ADHD. The other medications prescribed were

selective serotonin reuptake inhibitors. Other than for ADHD, a majority of preschoolers with mental health conditions were not routinely prescribed psychotropic medication (See Table 4).

Comment

In this study of 2,422 children, 5.2% of parents reported IPV and 32% reported depressive symptoms at least once during routine pediatric visits within the first three years of a child's life. Roughly 2% of the sample reported both. Children whose parents reported both IPV and parental depressive symptoms before age three were more likely to be diagnosed with ADHD after age 3 when compared to children who were not exposed to either IPV or parental depressive symptoms, and children with parents who reported depressive symptoms only were more likely to later be prescribed psychotropic medication compared to children without exposure to IPV or parental depressive symptoms, even after adjusting for gender, race/ethnicity and insurance type.

Our study supports existing literature finding that IPV exposure is associated with significant childhood mental health and behavioral concerns.[11,43-45] However, ours is the first prospective study within a pediatric clinical setting. Moreover, our study is one of the first to examine associations among IPV exposure, parental depression, and associated behavioral health outcomes among preschoolers. In our sample, exposure to both IPV and parental depression before 3 years of age was associated with preschool-onset ADHD. This study contributes to a growing body of evidence that social risk factors can negatively impact children's functioning, which can lead to alterations in their stress response systems and put them at greater risk for negative health outcomes as they age.[15,21,46-48] It also supports the trend toward identifying ADHD in the preschool years and highlighting the pediatrician's important role in this early

identification.[49] In our study, preschoolers exposed to a parent who reported depressive symptoms within the first 3 years of life were more likely to have been prescribed psychotropic drug treatment, especially stimulants. However, unless the preschooler had a diagnosis of ADHD, the majority of preschoolers with mental health conditions were not prescribed psychotropic medication.

Pediatricians play a critical role in providing continuous care for families, performing surveillance of development and behavior, and addressing academic and health issues as children enter school.[12,50] Children in families reporting IPV, past or present, should be screened for mental health conditions, and monitored over time for behavioral concerns and poor functioning. Our study support the findings that the presence of both IPV and parental depression increase the risk of poor functioning among elementary-school age children[15] but demonstrates that significant effects can occur in children as young as 3 years of age.

The prevalence of IPV in our sample was 5.2%, similar to other studies in pediatric settings.[39,51-53] A variety of methods are effective for eliciting sensitive health risks such as IPV.[54] In our study parents may have left the IPV screening questions blank for a number of reasons. Mothers may fear for their own safety and the safety of their children should disclosure of IPV become known to the perpetrator.[55] However, poor literacy or insufficient time may also have caused non-responses. Nonetheless, active surveillance of IPV and parental depression by primary care pediatricians allows for early intervention efforts within the medical home, which may ultimately help prevent subsequent mental health issues.

Another important feature that distinguishes this study from previous research in the field is the sample population from which the subjects were drawn. Whereas previous studies drew primarily from battered women's shelters or populations of dependent children whose mothers

were victims of police-reported or court-reported IPV, this study drew prospectively from the general population of children whose caregivers screened positive for IPV in one of four community pediatric practice sites. Moreover, we collected data within one cohort, thereby reducing the risk of bias that is often present in case control designs. Unlike cross-sectional studies, which only describe one point in time, our approach shows the temporal relationship between early IPV, parental depressive symptoms and later preschool mental health problems.

Lastly, we elected to use administrative ICD-9 billing data to classify behavioral health outcomes of interest. While this data source has some limitations, coding errors tend to be random and are unlikely to create a bias in our study. It is known that depressed mothers, with or without concurrent IPV, often have more concerns regarding their children's behavior.[56,57] Social desirability and recall bias are, therefore, more likely to bias studies relying on parental report of child behavior, especially if the reporting parent has a known history of IPV or depression.[58]

As with all studies, there are limitations that should be considered when interpreting our results. Because our study was observational, we may not have been able to account for all possible confounders, such as concurrent child abuse. We did make every effort, however, to control for the most salient confounders by adjusting for socio-demographic characteristics, IPV and parental depressive symptoms. Also, our characterization of IPV exposure was only loosely based on validated surveillance questions adapted from the Partner Violence Screen.[59] The surveillance item, "feeling safe at home," may have low specificity in detect intimate partner violence.[60] However, asking whether a parent has been "kicked, hit or slapped" by a partner is correlated with IPV, and has been used alone or as part of a brief screener suitable for primary care.[51,61] We elected to include both items on the CHICA PSF. Based on previous work, we

know that when the two IPV surveillance items are printed on the PSF, parents will respond to those items 88.1% of the time.[36] In addition, there is evidence that mothers may prefer the use of indirect or general screening questions when children are present.[62,63]

The method of capturing parental depressive symptoms changed during the study from the PHQ-2 to EPDS-3. While using the PHQ-2 to detect depression in primary care settings is valid,[41] surveillance items in CHICA were changed to the EPDS-3 because the EPDS-3 was validated for postpartum depression.[42] Moreover, scores from the EPDS or the PHQ-9, from which the PHQ-2 is derived, are often concordant when using either instrument to screen for major depression in the clinical care setting.[64]

Pediatricians should increase their efforts to screen children under the age of 3 preferentially for the possibility of IPV and other social risk factors whenever a parent or teacher raises behavioral concerns.[51,65] Should early IPV and parental depression exposure be identified, pediatricians can perform active surveillance at each subsequent visit for emerging behavioral issues and maternal-child interaction problems related to impaired maternal functioning. In addition, treatments aimed at ameliorating parental depression symptoms can lead to reductions in child behavior problems, and should be part of the treatment plan for children with behavioral or mental health disorders.[66] Early identification of family psychosocial risk factors may ultimately translate into improved mental health outcomes for children.[67]

Conclusion

Children whose parents report IPV and depressive symptoms before age three are at increased risk for the development of preschool-onset ADHD, and those whose parents report depressive symptoms only are more likely to be prescribed psychotropic medications in their

preschool years. Pediatricians play a critical role in performing active, ongoing surveillance of families with these known social risk factors, and providing early intervention to negate long-term sequelae.

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Table 1. Psychotropic medications of interest examined

Medication Class	Examples of psychotropic drugs
Stimulants	methylphenidate, Ritalin, Methylin, Ritalin-SR, Methylin-ER, Metadate-EF, Ritalin LA, Metadate CD, dexmethylphenidate, Focalin, Adderall, Adderall XR, dextroamphetamine, Dexedrine, dextrostat, Dexedrine spansules, and Concerta
Non-stimulants	Strattera/Atomoxetine, Bupropion/Wellbutrin, Wellbutrin SR, and Wellbutrin XL
Alpha-2-agonists	Tenex/Guanfacine, Intuniv, Clonidine/Catapres, and Kapvay
Atypical antipsychotics	risperidone/Risperdal and aripiprazole/Abilify
Sleep agents	Trazadone/Desyrel
Selective serotonin reuptake inhibitors	fluoxetine, sertraline, citalopram, escitalopram, and paroxetine

Table 2. Sample characteristics

Variable	**N (%)[a]** (n=2422)
Socio-demographics	
Gender	
Male	1260 (52.0)
Female	1162 (48.0)
Race/Ethnicity	
White	253 (10.5)
Black	984 (40.6)
Hispanic/Latino	1102 (45.5)
Other	83 (3.4)
Insurance Type	
Commercial/Private	92 (3.8)
Medicaid/Public	2170 (90.3)
Uninsured/Self-Pay	142 (5.9)
Report of any IPV exposure before age 3 years	127 (5.2)
Any parental depressive symptoms before age 3 years	762 (31.5)
Early risk factor (exposure before 3 years of age)	
IPV only	69 (2.9)
Parental depression only	704 (29.0)
IPV and parental depression	58 (2.4)

Neither IPV or parental depression	1591 (65.7)
ICD-9 Diagnoses at 3 to 6 years of age	
Attention-deficit hyperactivity disorder	80 (3.3)
Disruptive behavior disorder	209 (8.7)
Anxiety	17 (0.7)
Depression	9 (0.4)
Sleep Problems	7 (0.3)
Adjustment Disorder	41 (1.7)
Psychiatric Treatment	
Any Psychotropic Treatment	48 (2.0)

IPV= intimate partner violence

ICD-9= International Statistical Classification of Diseases and Related Health Problems, Ninth Edition

[a] Totals vary due to missing data

Table 3. Association between IPV, parental depressive symptoms and mental health conditions among preschoolers*

Mental health condition	Psychosocial exposure					
	IPV only N=73		Depressive symptoms only N=632		IPV and depressive symptoms N=53	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
ADHD	1.8	0.5-6.1	1.5	0.9-2.5	**4.0**	**1.5-10.9**
DBD	1.1	0.4-2.5	1.1	0.8-1.5	1.4	0.6-3.5
Anxiety	---	---	0.5	0.1-18.0	2.3	0.3-18.0
Depression	---	---	1.8	0.5-6.7	---	---
Sleep Problem	---	---	2.8	0.6-12.7	---	---
Adjustment Disorder	---	---	1.5	0.8-3.0	2.6	0.6-11.2
Any Psychotropic Treatment	1.9	0.4-8.8	**1.9**	**1.0-3.4**	2.6	0.6-11.5

*Multivariable logistic regression with robust estimates, adjusting for gender, race/ethnicity, insurance type.

IPV: intimate partner violence; ADHD: attention-deficit hyperactivity disorder; AOR: adjusted odds ratio; DBD: disruptive behavior disorder; CI: confidence interval; ns: non-significant.

Variables that achieved statistical significance are bolded

Table 4. Prevalence of psychotropic medication prescriptions for preschoolers with an ICD-9 mental health condition

ICD-9 Mental Health Condition	Psychotropic Medication		% having ever received psychotropic treatment
	Yes	No	
ADHD (n=80)	40	40	50.0%
DBD (n=209)	34	175	16.3%
Anxiety (n=17)	3	14	17.6%
Depression (n=9)	3	6	33.3%
Sleep Problems (n=7)	1	6	14.3%
Adjustment Disorder (n=41)	9	32	22.0%

ICD-9= International Statistical Classification of Diseases and Related Health Problems, Ninth Edition

ADHD: attention-deficit hyperactivity disorder

DBD: disruptive behavior disorder